

- 1 • The previous "Background of the Invention" has been deleted in its entirety and
2 replaced. This statement now briefly recalls the many failed experiments cited by
3 the examiner, notes the new reality of 'cold nuclear fusion' in the deuterium-
4 palladium system and cites how the present invention evolved from the chaos of the
5 past decade.
- 6 Page 4: • Changes in the "Brief Summary of the Invention" (1) clarify that the present
7 invention is a reactor and system with a method for containing and controlling a
8 deuterium nuclear fusion reaction in a host metal lattice; (2) summarize the enabling
9 method; (3) relate the necessary energy relationships to the range of operating
10 temperatures and pressures; (4) clarify the host metal selection method.
- 11 Page 5: • Changes in the "Brief Description of the Drawings": (Please see the following
12 section "IN THE DRAWINGS".)
- 13 Page 6: • The "Reactor Assembly" section is added to: (1) better organize the ensuing
14 sections; (2) make reference to Figure 4; and (3) describe an example of a
15 'permanent sealing' device.
- 16 Page 7: • The "Reactor Body" section now includes two specific candidate materials for
17 fabrication of the reactor body and indicates the operating temperature ranges
18 available when each is used.
- 19 Page 9: • Statement about a mixture of gases is deleted. Limits on mixed gases are not known
20 at this time.
- 21 • Changes in "How the Reactor Works": (1) states the objective of the 'method'
22 described; (2) clarifies that no specific D/Pd concentration is required for
23 operability; (3) clarifies that it is the 'change of state' of the dissolved deuterium
24 that enables the fusion reaction; (4) clarifies that the gas chemical potential is
25 controlled by controlling the gas pressure and the reactor temperature; (5) cites
26 Reference 5 for the relationship between the gas chemical potential and that of the
27 dissolved deuterium; and (6) makes reference to a later section for predicting
28 performance of sealed reactors.
- 29 Page 10: • Changes in the "Chemical Potential" section: (1) cites Reference 5 for the derivation
30 of chemical potential and its meaning in terms of the 'system free energy state'; (2)

clarifies that the method for selecting host metals is by conducting screening tests in a 'scanning reactor' to measure the threshold chemical potential of a candidate host metal; (4) describes the method of determining the relationship between operating chemical potential and the power density for a selected candidate host metal; (5) describes the necessary qualities of the scanning reactor and its operating range.

Page 13: • Adds "Host Metal Installation" section which cites three candidate method of installing the host metal in the reactor body. (Applicable text from "Host Metal" section on Page 8 has been incorporated here.)

Page 14: • Change to "System Control" section cites the reaction heat rate as being an exponential function of temperature.

Page 15: • Adds "Control of the Sealed Reactor" section that clarifies that increasing the heat rate of the sealed reactor is by increasing the operating chemical potential. It cites the need to predict the internal pressures as the temperature is increased so that the operating chemical potentials may then be predicted and matched to the host metal heat rate characteristics.

Page 15: • Adds the title "Predicting the Performance of Sealed Reactors" to the unchanged text from the old Specification.

Page 17: • Adds "Useful Life of the Sealed Reactor" section to explain (1) how the deuterium depletion takes place, (2) how it affects the heat rate and (3) the necessary corrective measures to extend the useful life of the sealed reactor.

Page 18: • Minor changes to (1) correct references to the enabling heater added to Figures 1 & 2 and (2) to cite an alternate procedure when the selected loading temperature is too low.

Page 20: • The procedure for increasing the operating temperature of a sealed reactor is added.

IN THE DRAWINGS:

Figure 1 is changed to show the enabling heater.

Figure 2 is added to depict a typical reactor with fins for heat transfer.

Figure 3 was Figure 2.